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LI.—*A Collection of Entozoa, chiefly from Birds, from the Murman Coast.* By H. A. Baylis, M.A.

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The material to be described in this paper was collected by Surg.-Lieut. E. A. Cockayne, R.N., while in H.M.S. 'Intrepid' (then serving off the Murman coast), and kindly presented by him to the British Museum. The collection consists chiefly of parasites of birds shot by Dr. Cockayne and his fellow-officers at localities on the Murman coast, Kola Peninsula, Arctic Russia.

18 species of Cestodes are represented (excluding larval forms), 3 of Nematodes, and 1 of Acanthocephala. Of the Cestodes, 5 appear to be new species or varieties, while of several the specific determination remains doubtful.

CESTODA.

A. Pseudophyllidea.

Bothriocephalidæ.

Bothriocephalus bipunctatus (Zed.) (?).

Host: Cottid fish. Yukanski, 29. vi. 1917.

The material consists only of fragments of the strobila, unfortunately without scolices. The width of the segments

is rather small for *B. bipunctatus*, and the determination is somewhat uncertain.

Abothrium infundibuliforme (Rud.).

Host: Salmon. Yukanski, 11. vii. 1917.

A large number of specimens of this species were found hanging out of, and blocking up, the pyloric appendages of the intestine of the fish.

Plerocercoid Larvæ.

Hosts: Cottid fishes. Yukanski, 29. vi. 1917 and 22. vii. 1917.

Larval forms, apparently of two species of Bothriocephalidæ, occurred in two of the fishes examined. One form (A) has a distinct head with pronounced lateral grooves; two examples of this were found at the surface of the liver. In the other form (B) the head is not distinctly marked off and the suckers are obscure.

B. Cyclophyllidea.

Tetrabothriidæ.

Tetrabothrius intrepidus, sp. n. (Figs. 1 & 2.)

Host: *Uria grylle* (black guillemot). Yukanski, 27. vi. 1917.

This species is represented only by a single scolex and some fragments. The length of a complete specimen is unknown. The maximum width is 3 mm. The scolex (fig. 1) is 0·6 mm. in width. The suckers are large, dependent, and widely open, curling outwards posteriorly, and resembling shallow basins. Auricular appendages are represented only by a slight finger-shaped lobe (fig. 1, *A.*) at either side of the scolex, between the dorsal and ventral suckers. Anteriorly the scolex bears a slight papilla (fig. 1, *P.*).

Segmentation begins close behind the scolex; the segments are much wider than long throughout. The genital pores are all situated on the right side. The male and female ducts open at the base of a large muscular cloaca (fig. 2, *Cl.*), on a papilla which projects into it. The cirrus-sac (fig. 2, *C.S.*) is squat, triangular in horizontal section, and has a thick muscular wall.

The testes number about fifty, extending across the dorsal

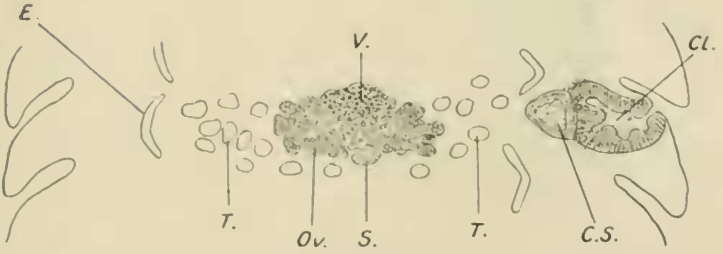
side of the segment and down on either side of the female organs. The ovary consists of a double rosette of lobes, symmetrically arranged in the middle of the segment. It is transversely elongated, and measures 0·35 mm. across. The yolk-gland is compact and lies in front of the ovary, exactly in the middle line. The shell-gland lies behind the ovary, a

Fig. 1.

Tetrabothrius intrepidus; the scolex.

A., auricular appendage; *P.*, apical papilla; *S.*, sucker.

Fig. 2.



Tetrabothrius intrepidus; horizontal section through a mature segment.

Cl., genital cloaca; *C.S.*, cirrus-sac; *E.*, longitudinal excretory canal; *Ov.*, ovary; *T.*, *T.*, testes; *V.*, yolk-gland.

little towards the pore side. In gravid segments the uterus forms an irregular sac.

Both dorsal and ventral excretory vessels are present, but there appear to be no transverse vessels. The longitudinal musculature is powerfully developed, consisting of more than

fifty stout bundles dorsally and a similar number ventrally. There is no very clear distinction into outer and inner layers. The genital ducts pass between the dorsal and ventral excretory vessels and ventrally to the longitudinal nerves.

This form differs from *T. erostris* (Lönnberg), which occurs in the same host, in the larger size of the scolex, the slight development of the auricular appendages, the larger number of testes, and other details.

Mesocestoididæ.

Mesocestoides litteratus (Batsch).

Host: *Vulpes vulpes* (red fox). Yukanski, 23. vii. 1917.

This species occurred in considerable numbers in the upper part of the small intestine.

Davaineidæ.

Davainea tetragona (Molin), var. *lagopodis* (var. n.).

Host: *Lagopus mutus* (ptarmigan). Murmansk, Kola Inlet, 2. vi. 1917.

Two specimens of a *Davainea* closely resembling *D. tetragona* (Molin) were found in a ptarmigan killed at Kola Inlet. This species is stated by Clerc * to occur in *Lagopus albus* † in the Ural, but the present examples show certain peculiarities that seem to indicate a distinct variety.

The length of a complete specimen is about 20 cm. and the maximum width 5 mm. The scolex measures 0·3 mm. across. The suckers are oval, their longest diameter (anteroposterior) being about 0·14 mm. The diameter of the rostellum is 0·055 mm. It is armed with a single row of minute hooks, 8 μ long. The suckers are armed with several rows of very small hooklets.

There is a considerable unsegmented neck, as in the typical *D. tetragona*. The segments are much broader than long, except the gravid ones near the posterior end. The transverse excretory vessels are very wide, often appearing as wide as the medullary portion of the segments between them.

The genital pores are unilateral; the cirrus-sac is small (0·15 mm. long), but muscular. The vas deferens is considerably coiled, but, as a whole, pursues a fairly straight

* Bull. Soc. Oural. Sci. nat. xxx. 1910, p. 123.

† The bird referred to as *L. albus* seems more likely to have been *L. mutus*. The former, as I am informed by Mr. C. Chubb, is an American form, though it ranges into Scandinavia and Northern Russia.

course towards the middle of the segment. The testes are very numerous (about one hundred), extending throughout the medullary parenchyme on either side of the female glands. The ovary consists of two symmetrical bunches of lobes situated in the middle of the segment. The yolk-gland is situated at the back of the segment. The shell-gland is a conspicuous organ lying between the ovary and the yolk-gland. The vagina runs fairly straight from the genital pore to the middle of the segment, its inner end, functioning as a receptaculum seminis, persisting in the gravid segments after most of the other organs have disappeared. The oviduct becomes very wide before opening into the uterus, running vertically for the last portion. The uterus appears at first as a transverse tube, but afterwards disappears, and numerous egg-capsules are formed.

The most important character distinguishing this form from the typical *D. tetragona* is the much larger number of testes (twenty to thirty in *D. tetragona*, about one hundred in the present variety).

Dilepinidæ.

Lateriporus teres (Krabbe), Fuhrmann, 1907.

Host: *Somateria mollissima*. Yukanski, 8. vi. 1917; Petschenga, 24. ix. 1917.

This species seems to be fairly common in the eider-ducks in this region. It was met with in two individuals obtained at the first-given locality, and in another at the second.

Choanotænia paradoxa (Rud.). Clerc, 1903.

A single specimen, probably referable to this species, was obtained from a red-necked phalarope (*Phalaropus lobatus*) at Yukanski, 10. viii. 1917.

Choanotænia sp. (?).

(Not *Ch. borealis* (v. Linst., 1905), Fuhrmann, 1908.)

Host: *Clangula hyemalis* [= *Harelda glacialis*] (long-tailed duck). Yukanski, 8. vi. 1917 and 10. vi. 1917.

There are several fragments of what appears to be a species of *Choanotænia*, or possibly *Anomotænia*, obtained on different occasions from two long-tailed ducks. Unfortunately, however, there is only one scolex, and this has lost its rostellum, so that the characters of the hooks, so important

for diagnosis, are unknown. The species differs from *Ch. borealis* (v. Linst.) in having forty-five to forty-eight testes, instead of twenty-five, in each segment, and also in having a smaller scolex (0·43 mm. across at the suckers, instead of 0·67 mm.).

Anomotænia campylacantha (Krabbe), Zschokke, 1903.

Host: *Uria grylle*. Yukanski, June and July 1917.

Numerous examples of a worm which may be referred to this species occurred in several black guillemots, associated in one case with *Tetrabothrius intrepidus*. They usually occupied the upper part of the intestine, just below the gizzard.

Anomotænia micracantha (Krabbe), Zschokke, 1903.

Host: *Uria grylle*. Yukanski, 22. x. 1917.

A second and rather larger species, which I refer to *A. micracantha*, occurred in considerable numbers in one of the same birds in a similar position to the preceding form.

Monopylidium arcticum, sp. n. (Figs. 3 & 4.)

Host: *Tringa maritima* (purple sandpiper). Yukanski, 7. viii. 1917.

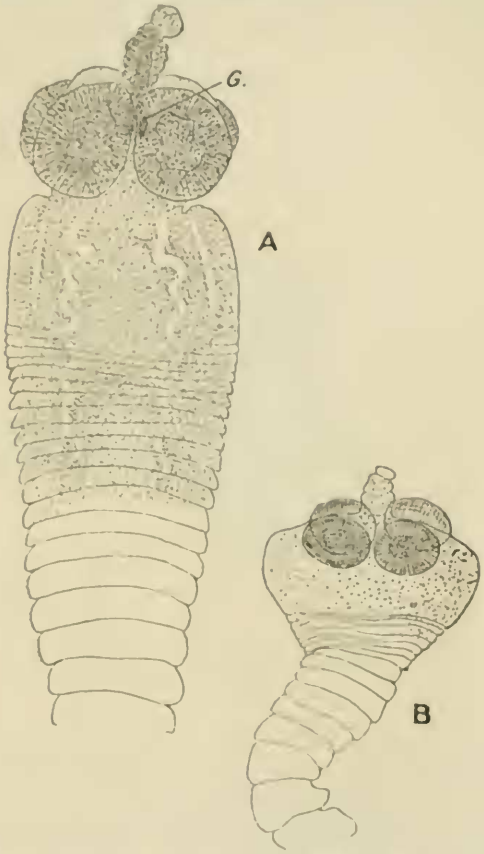
This is a slender little worm, about 3·5 cm. long when fairly extended. The maximum width (at the posterior end of the strobila) is about 0·5 mm. A peculiar feature is the tendency of the neck to be very much contracted in the longitudinal direction (fig. 3, **B**) and very wide just behind the scolex. Nearly all the specimens show this contraction, which gives them, to the naked eye, the appearance of having a very large, flattened scolex.

The scolex (fig. 3, **A**) measures about 0·24 mm. across the suckers, the diameter of the latter being 0·12 mm. The rostellum has a mushroom-shaped end and a fleshy and muscular stalk. There is a single row of about thirty (?) hooks, measuring about 15 μ in length. There is a pair of glandular (?) structures (fig. 3, **A**, *G.*) at the base of the rostellum, in the substance of the scolex.

The strobila contains some eighty segments, which are considerably longer than broad, except those near the anterior end. They gradually increase in length towards the posterior end, some of the gravid segments being fully three times as long as broad. The longitudinal musculature is very well developed. Mature segments (fig. 4) begin to appear at

about the fiftieth. The genital pores are situated near the front of the segment and irregularly alternating. There is a muscular genital atrium (fig. 4, *G.A.*) into which the cirrus-

Fig. 3.



Monopylidium arcticum; the scolex and anterior end of the strobila.

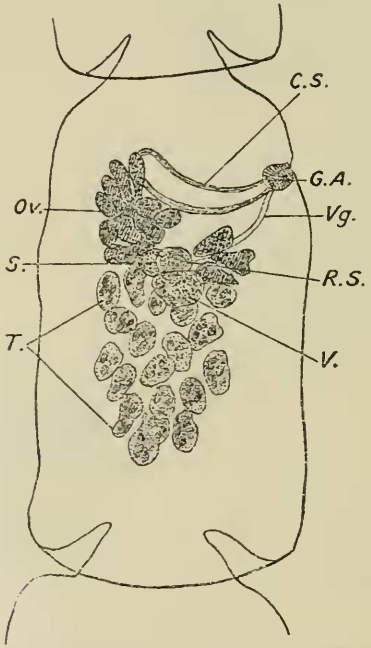
A. An example with moderately contracted neck; *G.*, paired glands ($\frac{2}{1}$) at base of rostellum.

B. An example (less highly magnified) showing marked contraction of the neck.

sac and vagina open. The cirrus-sac (fig. 4, *C.S.*) is very long and narrow, measuring 0·175 mm. in length and 0·035 mm. in width. It curves forwards from the genital

atrium towards the anterior border of the segment, and ends at, or even beyond, the middle line. The testes (fig. 4, *T.*) number about twenty, and occupy the posterior half of the segment. There is a much-coiled vas deferens. The ovary consists of two groups of lobes, the larger group being on the aporal side. Between the two portions of the ovary there is a large rounded receptaculum seminis (fig. 4, *R.S.*); close to

Fig. 4.



Monopylidium arcticum; semi-diagrammatic drawing of a mature segment (from a whole preparation).

C.S., cirrus-sac; *G.A.*, genital atrium; *Ov.*, ovary; *R.S.*, receptaculum seminis; *S.*, shell-gland; *T.*, testes; *V.*, yolk-gland; *Vg.*, vagina.

this is the shell-gland (fig. 4, *S.*), and behind both these the compact yolk-gland (fig. 4, *V.*). There are only a few ripe segments at the posterior end of the strobila. There is no definite uterus, the ova being embedded singly in the parenchyme. The onchospheres are about 20 μ in diameter.

This form differs from *M. cinguliferum* (Krabbe) in a number of points, notably in its smaller number of testes,

while it is readily distinguished from *M. macracanthum*, Fuhrm., by the much smaller size of its hooks. Both these species occur in closely related hosts.

Monopylidium stercorarium, sp. n. (Figs. 5–7.)

Host: *Stercorarius pomarinus* (pomatorhine skua). Yukanski, 22. vi. 1917.

This is a comparatively short worm, measuring 2·5–3 cm. in length. The maximum width is about 0·8 mm. (near the posterior end). The number of segments is rather small (about ninety).

Fig. 5.

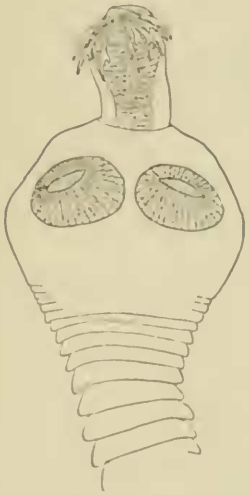


Fig. 6.

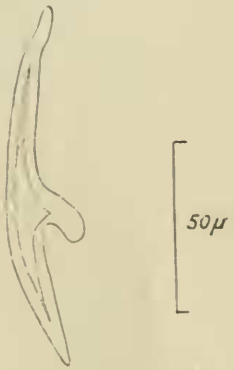


Fig. 5.—*Monopylidium stercorarium*; the scolex.
Fig. 6.—Ditto; hook from the rostellum.

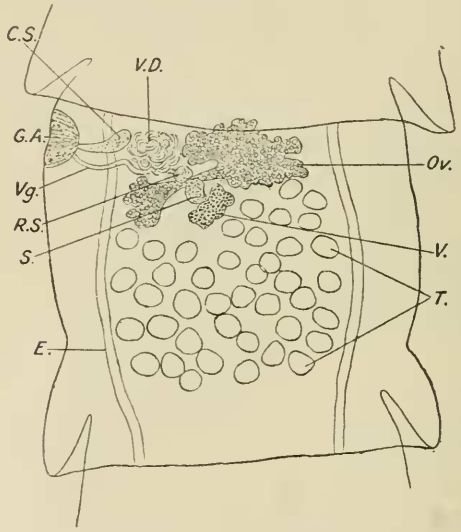
The scolex (fig. 5) measures about 0·4 mm. across, and the suckers are 0·18 mm. in diameter. The rostellum is rather long and stout, and is armed with a single crown of fourteen (?) very large hooks, 110 μ in length (fig. 6). The long roots of the hooks meet at the apex of the rostellum.

Segmentation begins immediately behind the scolex. The anterior segments are broader than long; soon, however, they become squarish, and posteriorly they are much longer than broad. Rudiments of genital organs begin to appear at

about the thirtieth segment, and young mature segments begin at about the sixtieth. There may be about eight or nine gravid segments at the posterior end, but the number is never large.

In a mature segment (fig. 7) there are about forty testes, occupying the posterior two-thirds of the segment, and extending forwards on the aporal side of the ovary. The genital pores are irregularly alternating and situated near

Fig. 7.



Monopylidium stercorarium; semi-diagrammatic drawing of a mature segment (from a whole preparation).

C.S., cirrus-sac; *E.*, excretory canal; *G.A.*, genital atrium; *Ov.*, ovary; *R.S.*, receptaculum seminis; *S.*, shell-gland; *T.*, testes; *V.*, yolk-gland; *V.D.*, vas deferens; *Vg.*, vagina.

the anterior corner of the segment. There is a muscular atrium (fig. 7, *G.A.*) into which the male and female ducts open. The cirrus-sac is small, measuring $0{\cdot}15 \times 0{\cdot}037$ mm. The vas deferens is long and much coiled, a large mass of its coils (fig. 7, *V.D.*) just between the cirrus-sac and the ovary functioning as a seminal vesicle. The ovary consists of a larger and a smaller portion, the former being on the aporal side. Behind it is the yolk-gland, and between this and the

narrow middle portion of the ovary is a rather large shell-gland. Just in front of the shell-gland is a small rounded receptaculum seminis.

There is no definite uterus in the gravid segments, the ova being scattered singly in the parenchyme. The onchospheres measure about 25 μ in diameter.

This species bears an exceedingly close resemblance to *Choanotænia porosa* (Rud.) in many respects, but the hooks are of a slightly different shape, the cirrus-sac is much smaller, and the uterus is not sac-like. The small number of segments is also a feature not characteristic of *Choanotænia*.

Hymenolepinidæ.

Hymenolepis microsoma (Crepl.), Cohn, 1901 (?).

Host: *Œdemia nigra* (common scoter). Yukan-ki, 8. vi. 1917.

A number of fragments, unfortunately without scolices, which probably belong to this species, were the only parasites found in this bird.

Hymenolepis spp. A and B.

Host: *Clangula hyemalis* [=*Harelda glacialis*] (long-tailed duck). Yukanski, 8. vi. 1917.

The collection includes portions of about three specimens of species of *Hymenolepis* from this bird. Apparently at least two species are represented, but the material is too fragmentary for precise determination. One specimen has a very small scolex, with a little button-like rostellum, apparently unarmed. The scolex measures 0·096 mm. across and the suckers only 0·03 mm. in diameter. This may be called species A. In the mature segments the three testes are arranged in a transverse row, and the fan-shaped ovary lies between the middle and aporal testes. The entire specimen is about 4½ cm. in length, and the maximum width is about 1·5 mm.

Another specimen, which may be called species B, has a larger scolex with a more typical rostellum, which was apparently provided with hooks; these, however, have all been lost. The ovary, in this case, lies between the middle testis and that on the pore side.

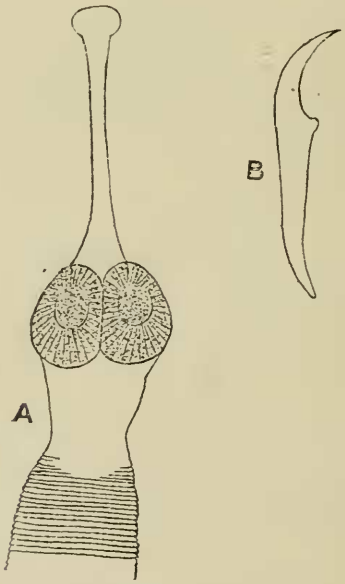
Hymenolepis sp.

Some fragments of the strobila of a *Hymenolepis* also occurred in one of the eider-ducks (*Somateria mollissima*) at Yukanski, together with an *Aploparaksis* to be described below; but the absence of a scolex makes determination difficult or impossible.

Aploparaksis filum (Goeze), Clerc, 1902.

A headless fragment, perhaps referable to this species, was taken from a purple sandpiper (*Tringa maritima*) at Yukanski, 5. vi. 1917.

Fig. 8.



Aploparaksis murmanica.

A. The scolex, with extended rostellum.
B. Hook from the rostellum, much more highly magnified.

Aploparaksis murmanica, sp. n. (Fig. 8.)

Host: *Somateria mollissima.* Yukanski, 8. vi. 1917; Petschenga, 24. ix. 1917.

This is a very small and delicate species, which was

present, usually in considerable numbers, in all the eider-ducks examined.

An entire specimen measures 1 to 1½ cm. in length, with a maximum width of 0·36 mm. The scolex (fig. 8, **A**) is flattened dorso-ventrally, and measures 0·22–0·27 mm. across at the suckers and about 0·15 mm. in thickness dorso-ventrally. The suckers are very large, meeting in the middle line. The rostellum is long, slender, and proboscis-like, measuring about 0·35 mm. in length when fully extended. At the end it expands into a bulb. The hooks (fig. 8, **B**), which were only seen in specimens with the rostellum retracted, are ten in number and measure 65 μ in total length. They are of an unusual shape, having a very long "dorsal" and a greatly reduced "ventral" root.

Segmentation begins close behind the scolex. In a complete specimen there are some three hundred segments, which are broader than long throughout. The cirri, which are usually extruded, are spiny, and, when fully extended, measure about 0·05 mm. in length. The onchospheres measure about 20 μ in diameter.

Of the species of *Aploparaksis* hitherto recorded from Anseriform birds, this species is easily distinguished from *A. furcigera* (Rud.) and *A. birulai*, v. Linst., by the size and shape of its hooks. The hooks of *A. fuligulosa*, Solowiow, 1911, are undescribed, but the latter form has a smaller scolex and much longer cirri, among other points of difference. The description of *A. elisæ*, Skrjabin, 1915, I have unfortunately been unable to consult. *A. cirrosa* (Krabbe), which occurs in Lariformes, has hooks only 22 μ in length.

NEMATODA.

Ascaridæ.

Ascaris capsularia, Rud.

Hosts: Cottid fishes. Yukanski, June 1917.

This immature Ascarid, according to views put forward elsewhere by the writer *, is the larval form of *Ascaris decipiens*, Krabbe, which occurs as an adult in seals. The young forms are found in fishes of various genera and families, usually coiled up like watch-springs in capsules under the peritoneum.

The present examples came from various Cottid fishes, the precise determination of which is unknown. They agree in almost all respects with the description previously given *,

* 'Parasitology,' viii. no. 3, 1916, p. 360.

but the two portions of the œsophagus are, relatively to the whole body, considerably shorter, especially the anterior portion, which is only about half the length there given. Thus, in a specimen about 14 mm. long the anterior part of the œsophagus measures only 1·02 mm., the posterior part 0·78 mm., and in a 37 mm. specimen the two parts measure 1·8 mm. and 0·8 mm. respectively. This seems to indicate that a good deal of variability exists.

Dr. Cockayne informs me that these worms were not found, as usual, in capsules, but were embedded in the liver of the fishes or just under its covering membrane. When the liver was placed in a dish, they sometimes wriggled out quite freely.

Ascaris sp.?

From one of the fishes, among examples of *A. capsularia*, there is one small larval Ascarid of another species. It is about 10 mm. long, having a head with three rudimentary lips and a boring-tooth, and a gradually tapering tail about 0·2 mm. long, without a tail-spike. There is a conspicuous excretory cell running back to about 1·8 mm. from the anterior end. The œsophagus is about 1 mm. long, and there appear to be no œsophageal or intestinal diverticula.

Spiruridæ.

Streptocara sp. [? *S. pectinifera* (Neumann)].

Host: *Uria grylle*. Yukanski, 27. vi. 1917.

Neumann, in 1900, described a small nematode from the common fowl and guinea-fowl under the name of *Spiroptera pectinifera*. This has been made the type of a new genus—*Streptocara*—by Railliet and Henry *.

The present collection contains a single female specimen of a worm which evidently belongs to the same genus, and answers so closely to the description of *S. pectinifera* that it may be specifically identical. The absence of a male, however, renders determination uncertain and description comparatively worthless. The specimen in question was found in the crop of the host. If the species is identical with *S. pectinifera*, it is remarkable that it should occur in hosts so distantly related as the common fowl and the black guillemot.

* Compt. rend. Soc. Biol. lxxiii. 1912, p. 622.